Strategic directions for the primary prevention of skin cancer in Canada

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Strategic directions for the primary prevention of skin cancer: Canadian context

The National Sun Safety Committee (NSSC) was established by the Primary Prevention Action Group of the Canadian Strategy for Cancer Control (CSCC) to facilitate and promote inter-provincial coordination of skin cancer prevention strategies. The NSSC has identified four strategic directions for the primary prevention of skin cancer in Canada. This document is in line with the goal of the NSSC to develop a coordinated evidence-based pan-Canadian strategic plan for the primary prevention of skin cancer in collaboration with the relevant government agencies and non-governmental partners. This report is an adaptation of Cancer Council Australia’s “Strategic directions in skin cancer control – 2003 to 2008” document. The objectives and recommended strategies included in this report were developed with a Canadian approach and vision for health promotion and skin cancer prevention. The success of these national strategic directions is contingent on many factors, particularly the leadership of the Provinces, including Ministries of the Environment, Health and Public Health; broad partnerships, financial support from multiple federal and provincial partners, and adequate funding of NSSC activities.

The Canadian Strategic Directions are based on the Ottawa Charter for Health Promotion and the Nutbeam framework in skin cancer control (Nutbeam et al. 1993). The levels for health promotion action are:

1) change attitudes, knowledge and, develop individual skills;
2) build healthy public policy;
3) strengthen community capacity; and
4) create supportive environments.

The directions, along with the specific objectives and recommended strategies identified for each in this document, have been reviewed by 32 national and international skin cancer control stakeholders (governments, non-governmental organizations, public health, dermatologists, etc.) at all levels (national, provincial/territorial, regional and local) and by the members of the NSSC.
Trends in skin cancer in Canada

Skin cancer in Canada is a significant public health issue in terms of human costs (morbidity and mortality) and dollar costs, both direct and indirect. In fact, skin cancer is the most common type of cancer in Canada. An estimated 78 000 new cases of non-melanocytic skin cancer (NMSC) – basal cell carcinoma and squamous cell carcinoma – and 4400 new cases of melanoma will be diagnosed in Canada in 2005 (Canadian Cancer Statistics 2005).

Because skin cancers other than melanoma are numerous and are usually treated without requiring hospitalization, most provincial cancer registries do not attempt to include them. Consequently, incidence and mortality rates and trends over time are generally available only for melanoma. The age-standardized incidence rate for melanoma (per 100 000) in Canada was 9.5 in 1992 compared to 11.40 in 2001 (Public Health Agency of Canada, cancer surveillance on-line), an increase of 20% over one decade. The estimated number of deaths due to melanoma in Canada in 2005 is 880. The age-standardized mortality rate for melanoma was 3 per 100 000 in 2001 and it increased slightly between 1992 and 2001.

Although skin cancer is believed to have a significant economic impact in Canada, few data are available on this topic. The economic burden of both NMSC and melanoma was assessed in Quebec for the year 1991 (Rhainsd M and De Guire L 1994). Both direct costs – the value of goods, services, and resources used for investigation, treatment, hospitalization, and rehabilitation related to skin cancer – and indirect costs – the value of economic output lost due to skin cancer-related work disability – were estimated. Data from the 1991 census, the Quebec cancer registry and the provincial health insurance plan were used to estimate the number of skin cancers treated in Quebec in 1991. The total cost associated with the estimated 15 184 skin cancers treated in Quebec in 1991 was $8.6 million (direct cost: $3,6 M; indirect cost: $5,0 M). Applying a very conservative inflation rate of 3% per year between 1991 and 2004, suggests that the costs associated with skin cancer in Quebec now reach at least $14 to 15 million. Extrapolating these estimates to all of Canada indicates that the economic impact of skin cancer is at the minimum about $55 to 60 million.

Risk factors for skin cancer

Exposure to ultraviolet (UV) radiation is the main risk factor associated with the development of all skin cancers. Sunlight is the main source of UV exposure in the population. Solar UV consists of a mix of about 90-95% UVA and 5-10% UVB at the earth’s surface. Solar radiation, and specifically the ultraviolet (UV) component of it, has been deemed carcinogenic to humans, causing basal cell carcinoma (BCC), squamous cell carcinoma (SCC), and melanoma. UVA and UVB have both been linked to carcinogenic
effects on humans (IARC 1992). However, artificial sources of UV such as sunlamps and tanning beds, which also emit varying proportions of both UVA and UVB, also contribute to human exposure to UV (Glanz et al. 2002).

Approximately 65-90% of skin cancers are caused by UV exposure (Amstrong 1993, Koh 1995). Total UV exposure depends on the intensity of the source, the duration of skin exposure, and the use of UV-protective behaviours (clothing, sunscreen, use of shade, etc.). Sunburns, particularly during childhood and adolescence, may play an important role in the development of skin cancer. An history of one or more sunburns increases the risk for both melanoma and BCC (Glanz et al. 2002). For these cancers, intermittent intense exposures (for which sunburns may be an indicator) carry higher risk, compared to SCC where total cumulative UV exposure appears to be an important factor (IARC 1992).

Although anyone can get skin cancer, some individuals are more susceptible. The risk of developing skin cancer is higher among those with fair or light skin color, red or blond hair and a tendency to freckle (Armstrong et al. 1996; Scotto et al. 1996). These people usually tan poorly and sunburn easily. A family history of skin cancer, particularly for melanoma, increases the risk 8 fold (Goldstein and Tucker 1995). Having a large number of benign moles (nevi) or having one or more atypical moles increases the risk of melanoma. Moles, which arise primarily during childhood and adolescence, are strongly related to UV exposure (Holly et al. 1994).

Skin cancer incidence increases exponentially with age. Melanoma occurs earlier than other forms of skin cancer, with one half of all cases before the age of 30 years (Glanz et al. 2002). Furthermore, melanoma is the third most common form of cancer in Canadians aged 30 to 39 years (Public Health Agency of Canada, cancer surveillance on-line).

Prevalence of behavioural risk factors of skin cancer

There is a lack of data on sun-related behaviours in the Canadian population. The most extensive data come from a national sun exposure survey that was carried out involving 4023 Canadian adults in 1996 (Lovato et al. 1998a). The results show that half (51%) of children (parent’s report on children, n= 1051) 12 years of age or less were in the sun for 2 or more hours daily during the summer (June to August). 45% of children had one or more sunburns in the same period. The proportion was higher in children 6 to 12 years of age (59%) than in younger children (39%) (Lovato et al. 1998b). The overall prevalence of sun protective behaviours reported in children range from 36% (always/often avoid the sun at peak times) to 76% (always/often use sunscreen). Among youths (15 to 24 years, n= 574), 36% were exposed for 2 hours or more per day during summer (Lovato et al. 1998c); 68% got one or more sunburns, including 22% who had 4 or more sunburns. Low levels of sun protective measures were found among youth: 26% reported always or often seeking shade or avoiding the sun at peak times of day on a regular basis. One-third of them used sunscreen. Similar results were observed among Canadian adults of 25 years of age or more (Shoveller et al. 1998),
although daily hours in the sun generally declined with age and use of protection increased.

A Quebec population-based survey on the use of artificial tanning devices found that 11% of the respondents (18-60 years old, n=1003) reported having used tanning equipment in a commercial tanning salon during the previous 12 months (Rhaïnds et al. 1999). The prevalence among adults aged 18 to 34 years was 31% during the 5 years before the survey. 18% of users experienced one or more sunburns from artificial tanning devices.

Sun safety among adolescents and young adults is a particular challenge. Their sun protective behaviours are poorer than those of children or older adults. Adolescents and young adults spend a substantial amount of time outdoors during the summer. They believe that a tan is desirable and consequently a high proportion use artificial tanning devices (Demko et al. 2003, Knight et al. 2002; Lazovich 2005). They also tend to use sunscreen inconsistently and incorrectly (Hall et al. 1994). As in the United States, UV radiation related behaviours in Canada reflect the increased availability of leisure time and fashion trends promoting tanned skin in the population. Many people still believe that suntanned skin is more attractive and associated with better health (Glanz et al. 2002). In 1992, a survey of U.S. adults on sun safety behaviours showed that only one-third of white adults used sunscreens (32%) and sought shade (30%) (Hall et al. 1997).

**Concerns regarding vitamin D and sun safety**

Because vitamin D in humans is produced in the skin following exposure to the UVB in sunlight, there is concern that limiting UV exposure may increase the risk of adverse effects of vitamin D insufficiency. This is an area of active research and at present, apart from an agreed upon definition of vitamin D deficiency, there is little agreement on how much circulating vitamin D is optimal, the significance of seasonally low levels or what the negative consequences of low (as opposed to deficient) levels of vitamin D really are. In Canada, during the middle of winter, the amount of UVB radiation in sunlight is too weak to synthesize vitamin D in the skin. During the other seasons, however, brief exposures to sunlight may help to maintain vitamin D levels in blood and tissues during those seasons and into early winter (IARC 1992, Risk and Benefits of Sun Exposure Position Statement). Diet (vitamin D fortified milk, fatty fish, eggs, etc.) is also a source of vitamin D to help to meet intake requirements in children and adults (Vieth 1999; Gagne et al. 2004). Supplementation is another source of vitamin D.

It is important to balance efforts to promote sun safe behaviours with those that encourage participation in outdoor physical activity because regular physical activity reduces morbidity and mortality for numerous chronic diseases.

There is strong evidence that adequate levels of vitamin D are needed for bone health (Risk and Benefits of Sun Exposure Position Statement). However, evidence about a number of other
potential beneficial health effects of sunlight, through either enhanced vitamin D levels or some other mechanism, is preliminary. A Consensus Statement evaluating current knowledge about the health benefits and hazards of sun exposure has recently been developed in Australia. A similar approach is recommended for Canada, where winter levels of UVB radiation are much lower in most of the country compared to Australia.

Strategies to reduce skin cancer

Skin cancer is a largely preventable disease. There are many prevention efforts that have been carried out in Canada by several organizations at the national, provincial, territorial and local levels such as: Environment Canada and the UV index program; Environment Canada with Health Canada and the “Children’s UV Index Sun Awareness Program; Canadian Cancer Society” and “Living with Sunshine” (a primary resource on sun protection for grade 1, 2, and 3); Canadian Dermatology Association and the Sun Awareness Program. These prevention activities are very encouraging on an individual basis in terms of cancer control in Canada. Unfortunately, it is difficult to measure the impact or efficacy of these efforts because there is no monitoring system for basal and squamous cell carcinomas nor have many programs been evaluated for efficacy in changing knowledge, attitudes and behaviours. In fact, primary prevention of skin cancer requires a broad partnership within the context of a national skin cancer control strategy. Integration of skin cancer prevention measures in Canada including evidence-based strategies for primary prevention is the best way to gather resources and collaborate towards the goal of reducing skin cancer incidence and mortality. Australia has already developed a national health care policy that has made prevention of skin cancer a societal responsibility (Cancer Council Australia 2003; Edlich RF et al. 2004). The United States also is exploring initiatives to build a national consensus on skin cancer prevention (Edlich RF et al. 2004)

Since 1999, Health Canada has worked in partnership with the Canadian Cancer Society/National Cancer Institute of Canada and the Canadian Associations of Provincial Cancer Agencies and other stakeholders to develop the Canadian Strategy for Cancer Control (CSCC). The CSCC has identified the following priorities: prevention, guidelines and standards, human resources, research and psychosocial and palliative care. Within the development of the CSCC, a primary prevention action group (PP-AG) was established during the National Symposium on Cancer Prevention that was held in Ottawa in March 2003. The mandate of the PP-AG is to promote the creation of a national/provincial/territorial and local community primary prevention system to address population-based risk factors for cancer.

The National Sun Safety Committee (NSSC) was established by the PP-AG with the mandate to “Develop and promote national strategic directions to decrease the burden of skin cancer in Canada, by reducing exposure to the sun and other sources of ultraviolet radiation.” Functions of the NSSC are:

1) Identify strategic directions for sun protection at the national level.
2) Identify strategic partners in the area of skin cancer prevention/sun safety.

3) Establish a partnership between involved stakeholders and increase communication across the country between the stakeholders.

4) Establish coordinated and consistent national objectives on sun safety that can form an umbrella for other programs in Canada.

The NSSC has identified four strategic directions that federal, provincial, territorial and municipal governments, and non-governmental organizations that have an interest in skin cancer prevention/sun safety may adopt to reduce the burden of skin cancer in Canada. It is not the intent of this document to discourage any current local initiatives in the area of skin cancer prevention; rather, all Canadian sun safety groups are encouraged to adapt the skin cancer prevention directions to their specific organizational and provincial, regional and/or local context. The four directions are:

1. Improve knowledge, attitudes and behaviours of Canadians concerning skin cancer and solar and non solar ultraviolet (UV) radiation protection.

2. Achieve healthy settings, organizations, products, policies and practices that promote sun protection.

3. Strengthen the community’s capacity for effective action on skin cancer prevention.

4. Strengthen informed decision making in the design, implementation and evaluation of skin prevention cancer strategies.

Strategic Direction # 1

**Improve knowledge, attitudes and behaviours of Canadians concerning skin cancer and solar and non solar ultraviolet (UV) radiation protection.**

**Objective:**

1.1 Improve knowledge of the harmful effects of solar and non solar UV radiation and the adoption of healthy sun protective behaviours (i.e. discourage Canadians from seeking a tan, using tanning salons and getting sunburned).

**Suggested strategies:**

1.1.1 Review and revise, if necessary, the 1995 Canadian consensus public education messages for reducing health risks from ultraviolet radiation (CDIC Volume 16 No. 1 1995).

1.1.2 Establish a national clearinghouse for sun safety educational materials.

1.1.3 Identify and evaluate materials, programs and strategies to improve knowledge among parents, children and young adults in schools, communities and recreational settings. Develop and test new materials as required.

1.1.4 Promote the implementation of a sun awareness component in all prenatal programs across Canada and postnatal communication strategies among new parents.

1.1.5 Develop strategies to improve knowledge in the population about the risks associated with tanning and tanning salons and to decrease the use of these devices. (i.e. Support the development
and implementation of a national mass media campaign to denormalize the desirability of a suntan among children, youth and young adults, which may include working with the fashion/cosmetic industry).

**Strategic Direction # 2**

*Achieve healthy settings, organizations, products, policies and practices that promote sun protection.*

**Objective:**

2.1 Build capacity to support skin cancer prevention policy development and implementation.

*Suggested strategies*

2.1.1 Support a collaborative and participatory approach through the creation of links with diverse organizations – both government agencies and non-governmental organizations – involved in sun safety across Canada.

2.1.2 Develop model policies and encourage their adoption. (i.e. policy/legislation to prevent people under 18 years of age from attending tanning salons, WHO artificial tanning guidelines).

**Objective:**

2.2 Improve sun protection policies and practices in care and educational settings where infants, children and young adults are concentrated.

*Suggested strategies:

2.2.1 Encourage adoption of sun protection policies and practices by childcare, preschool centres and primary schools across Canada.

2.2.2 Facilitate the development, implementation and evaluation of effective sun protection programs for primary and secondary schools across Canada.

**Objective:**

2.3 Increase the amount of natural or constructed shade in public places.

*Suggested strategies:

2.3.1 Develop shade guidelines in collaboration with Canadian Associations of Engineers and Architects and disseminate in every province and territory.

2.3.2 Promote shade creation policy for built and natural shade and building design standards at the municipal level across Canada, including out-door venues.

2.3.3 Promote shade creation policy for daycares and schools.

**Objective:**

2.4 Improve sun protection of players and spectators at outdoor sporting and recreation events.

*Suggested strategy:

2.4.1 Partner with outdoor sporting associations to promote the development of policies and practices to increase sun protection and reduce UV radiation
exposure of players and spectators at outdoor sporting and recreational events. (i.e. timing of events, shaded rest areas, shaded spectator areas).

Objective:

2.5 Improve sun protection among outdoor workers.

Suggested strategies:

2.5.1 Encourage development of sun protective policies and practices in relevant labour law at the federal, provincial and territorial level.

2.5.2 Develop resources to support the implementation of policies and practices for employers of outdoor workers.

Strategic Direction # 3

*Strengthen the community’s capacity for effective action on skin cancer prevention*

Objective:

3.1 Build a community of action for sun safety and skin cancer prevention.

Suggested strategy:

3.1.1 Promote formation of a network of practitioners, researchers, NGO’s and other primary prevention organizations to collectively promote sun safety and skin cancer prevention initiatives.

Objective:

3.2 Increase capacity of key professional groups to play a significant role in skin cancer prevention.

Suggested strategies:

3.2.1 Encourage inclusion of information on the harmful effects of sun exposure and healthy sun protective practices in all relevant education and training programs across Canada related to the medical, teaching, nursing, public health, architecture urban planning professions, etc.

3.2.2 Develop special communication strategies and tools for physicians, health care providers and teachers.

Strategic Direction # 4

*Strengthen informed decision making in the design, implementation and evaluation of skin cancer prevention strategies.*

Objective:

4.1 Increase capacity to monitor trends in the burden of skin cancer (e.g., incidence, mortality, survival, cost) and sun protective behaviours.

Suggested strategies:

4.1.1 Develop and carry out a national sun safety survey every ten years.

4.1.2 Improve monitoring of trends in the incidence of melanoma at the national and provincial level (improving cancer registry data collection processes where needed).

4.1.3 Monitor trends in the mortality, survival, thickness, etc. of melanoma across Canada.

4.1.4 Develop new strategies for monitoring trends in the incidence of non-melanoma skin cancer.

4.1.5 Support provincial health authorities and other organizations in estimating the economic burden associated with melanoma and non-melanoma skin cancer.
4.1.6 Assess the latest research in the areas of ultraviolet radiation and skin cancer prevention and summarize this on a regular basis in a format that can be used by health professionals.

**Objective:**

4.2 Increase capacity to learn what programs/policies are most effective in skin cancer prevention (effectiveness, cost-effectiveness, cost benefit of the interventions and programs).

**Suggested strategies:**

4.2.1 Develop and carry out a national survey or scan of current activities in skin cancer prevention in the provinces, public health units, etc.

4.2.2 Identify priorities for specific research and evaluation studies required in a number of areas, including, evaluation of skin cancer prevention strategies; methods to estimate individual sun exposure; and, economic evaluation into the cost benefit of primary prevention interventions.

4.2.3 Develop a strategy to publicize and disseminate recent research results about skin cancer and skin cancer prevention programs (knowledge translation).

4.2.4 Develop Canadian consensus statements on topical areas related to skin cancer prevention.

**Objective:**

4.3 Promote research to improve program development and evaluation on healthy sun protective behaviours and attitudes

**Suggested strategies:**

4.3.1 Identify social behaviours associated with tanning, sun protection and skin cancer awareness.

4.3.2 Determine the barriers to the adoption of sun protective behaviours and attitudes.

4.3.3 Identify motivators to change behaviours among target groups.

4.3.4 Determine the opportunities/facilitators for improvement in sun protective behaviours.

4.3.5 Modify strategies and program to improve sun protective behaviours based on results.

4.3.6 Identify outcome indicators to be assessed for evaluation of program effectiveness (i.e. decreased incidence of sunburn, decreased incidence of skin cancer).

4.3.7 Promote research in skin cancer prevention for specific target groups (i.e. children, youth, young adults, immunosuppressed, caregivers, out-door workers).
Conclusion

The National Sun Safety Committee (NSSC) has developed national strategic directions to reduce solar and non-solar ultraviolet radiation exposure in Canadians. Strategies have been developed for the primary prevention of skin cancer that involve individuals, the community, and governments at all levels to create sun protective public policy and supportive environments. The challenge in the near future is to support the dissemination, promotion, implementation and the evaluation of these strategic directions across Canada. Although the NSSC will play a major role in this field, it is evident that other relevant individuals and organizations, particularly at the provincial level, should be actively involved in nurturing a societal responsibility for the primary prevention of skin cancer in Canada. The success of these national strategic directions is contingent on many factors, particularly the leadership of the Provinces, including Ministries of the Environment, Health and Public Health; broad partnerships, financial support from multiple federal and provincial partners, and adequate funding of NSSC activities. In addition, further research on knowledge, attitudes and behaviours about skin cancer and ultraviolet radiation exposure appears to be a major piece of the puzzle needed to understand why a small percentage of the Canadian population adopts preventive measures and to adjust skin cancer prevention strategies and key messages in education campaigns based on this research. Finally, it is necessary to achieve better monitoring of skin cancer incidence and other short term end points (i.e. sun burn) in Canada in order to evaluate the impact of implementing the strategic directions identified in this report. A particular effort should be made by provincial cancer agencies to track both melanoma and non-melanocytic skin cancer incidence in Canada.


